

DEMYSTIFYING THE USE OF DIODE LASER FOR THE MANAGEMENT OF ORAL PYOGENIC GRANULOMA - A CASE REPORT

Dentistry

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ABSTRACT

French surgeons, Poncet and Dor, initially described pyrogenic granuloma in 1897 and termed it botryomycosis hominis. Well-known benign lesions include hemangiomas and pyrogenic granulomas of the oral cavity. It has been shown to exhibit a notable preference for the gingiva. Such a rare occurrence might be difficult to diagnose clinically because they can occasionally resemble more serious diseases like malignancies. This article's goal is to describe a rare instance of a benign tumor on the mandibular gingiva that was identified as pyrogenic granuloma both clinically and histopathologically. Conventional surgical excision, electrocautery, and lasers (erbium or diode) are the possible therapy options. This article describes the surgical removal of an oral pyrogenic granuloma with a 940 nm diode laser, listing benefits of using a 940 nm diode laser instead of more traditional treatment techniques for the surgical excision of oral pyrogenic granuloma.

KEYWORDS

Diode laser, Oral pyrogenic granuloma, Surgical excision

INTRODUCTION

Pyogenic granuloma (PG) is a benign growth of connective tissue that primarily affects the skin or mucous membranes. It is characterized by granulation tissue hyperplasia. Its startlingly fast growth rate makes it one of the most frequent lesions causing soft tissue enlargements. The term "pyogenic granuloma" was originally used by Hartzell in 1904, however Poncet and Dor initially reported pyogenic granuloma (PG) in 1897.^{1,2} The terminology is deemed as a misnomer since histologically it isn't an actual granuloma and is not associated with pus formation. It is a reactive inflammatory condition with dispersed inflammatory cells, immature fibroblastic connective tissue, and proliferating vascular channels. There are no documented racial preferences. Owing to the disagreement surrounding its actual pathological nature, this lesion has been referred to by a number of names, including vascular epulis, fibroangioma, polypoid capillary hemangioma, eruption capillary hemangioma, non-lobular capillary hemangioma, benign vascular tumor, septic granuloma, hemangiomatous granuloma, and Crocker and Hartzell's disease.³

Trauma, dental calculus, dental biofilm, pre-existing vascular lesions, chronic irritation from primary teeth exfoliation, primary tooth injury, eruption of permanent teeth, defective restorations in the lesion area, occlusal interference, food impaction, periodontitis, and trauma from toothbrushing are the etiological factors thought to be stimuli which initiate this reactive process. Seventy-five percent of the locations of predilection for this condition in the oral cavity are in the gingiva. There is no likelihood of malignant transformation or infiltrative growth with oral PG. After conservative excision, the recurrence rate is about 16%, and it is more likely to return when it affects the gingiva or manifests in pregnant women. Recurrence may result from incomplete surgical excision, failure to address the underlying cause, and repeated trauma to the region.⁴

The specific traits that each patient presents will determine how oral PG is managed or treated. Since it's a non-neoplastic growth, excisional therapy is the preferred course of action; nevertheless, numerous alternative methods have shown promising outcomes, including cryosurgery, laser excision, corticosteroid or ethanol injections, and sodium tetradecyl sulfate sclerotherapy.¹

A few instances of mucosal pyogenic granulomas successfully treated with a diode laser are anecdotal. In this paper, we seek to demonstrate the therapeutic effectiveness of intraoral pyogenic granuloma treated with diode laser.

Case Report

A 27-year-old male patient reported to the Out Patient Department of Periodontics, with a complain of localized gingival growth since 1

month. The outgrowing mass was not painful but often bled while eating, rinsing, or sometimes spontaneously. General physical examination revealed no other abnormalities, and there was no generalized lymph adenopathy. Intraoral examination revealed an oval-shaped, pedunculated mass-like growth seen in relation to the buccal aspect of gingiva with respect to 35, 36 regions, measuring approximately 2.5 cm × 3.5 cm. This discrete nodular, erythematous enlargement was covering almost two-third of the crown. On palpation, the mass was soft to firm in consistency and readily bled on probing. (Figure 1) Oral hygiene was well maintained, and no exacerbating factors were identified. No bony abnormalities were seen on intraoral periapical radiographic examination. The lesion was treated with Soft-tissue Diode Laser by Biolase, USA with wavelength 940 nm and 2 W power, keeping it in interrupted pulse mode. Local anaesthesia was delivered. The tip was kept at a distance of about 1 mm from the soft tissue throughout the procedure, and it took 4–5 min to completely excise the mass. (Figure 2) The diode laser provided an optimum combination of clean cutting of the tissue and haemostasis. Low level laser therapy (LLLT) was applied on the surgical site to aid in post operative healing.

Patient was discharged with all necessary post-operative instructions and was prescribed analgesics. The excised mass was sent for histopathologic evaluation which demonstrated Under Higher Magnification, hyperparakeratinized stratified squamous epithelium of varying thickness and most part of the epithelium exhibiting ulcerated. The underlying connective tissue stroma is loose to dense with interlacing bundles of collagen fibres with active plump to spindle shaped fibroblasts interspersed with numerous small to large blood capillaries lined by endothelial cells and filled RBCs with focal areas separated by connective tissue septae.

Diffuse inflammatory cells comprising of mixed inflammatory cells such as lymphocytes, plasma cells, few eosinophils, neutrophils and macrophages. (Figure 3) The above histopathologic features were suggestive of pyogenic granuloma. The patient was recalled after 2 weeks, and his postoperative healing was uneventful. (Figure 4)



Figure 1: An intra-oral picture of the lesion on the left lower gingiva

Figure 2: Excision of the lesion using a 400 µm surgical initiated tip

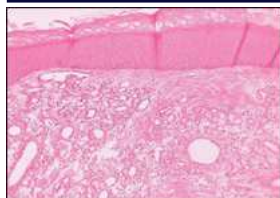


Figure 3: Photomicrograph of histopathological section under low



Figure 4: 2-week post-operative view of the surgical site

DISCUSSION

Pyogenic granulomas are well-known benign lesions of the oral cavity that exhibit a remarkable preference for the gingiva, lips, cheek, and tongue. However, palatal incidence of these lesions is exceedingly uncommon. It is primarily an oral disease associated with a tumour-like, exuberant tissue reaction to hormone fluctuations, mechanical trauma, or localized irritation. Pyogenic granuloma can occur at any age, however, 60% of cases are reported between the ages of 10 and 40. The frequency of the condition peaks in the third decade of life. The disease is twice as common in women. Because of the hormonal changes that women go through during adolescence, pregnancy, and menopause, they are significantly more vulnerable than men.⁵

Oral PG presents as a smooth, raised, or exophytic growth on a broad, sessile or pedunculated base. The surface of the growth is smooth and lobulated, with a red, hemorrhagic, and erythematous compressible papules that resemble warty, lobulated, ulcerated, and covered in a yellowish-blackish membrane. The PG patients in anamnesis reported bleeding, trouble chewing, and discomfort and tenderness as signs and/or symptoms.⁴

Pyogenic granuloma is primarily associated with an etiopathogenesis of mild trauma and/or prolonged inflammation. The presence of agents like streptococci and staphylococci may indicate an infection. Recurrent pyogenic granuloma has been linked to angiopoietin-1,2 and ephrin B2 agents associated with various vascular tumors, including Bartonella henselae, B. quintana, and human herpes virus 8. Satellite lesions and several pyogenic granulomas might result from trauma or complications during tumor excision. Numerous factors have been linked to this, including viral oncogenes, hormonal effects, microscopic arteriovenous malformation, inclusion bodies, and gene depression in fibroblasts. Haemangioma, peripheral giant cell granuloma, peripheral ossifying fibroma and metastatic carcinoma, and amelanotic melanoma are among the conditions that can be diagnosed as differentials for pyogenic granuloma.^{6,7}

Due to their ease of use, less learning curve for the dentist, and stress-free dentistry for the operating dentist, lasers have carved out an impression for themselves in today's clinical dentistry. They also offer a number of benefits, including no bleeding, minimal or no injections, improved visibility of the operating site, minimal pain and swelling after surgery, reduced requirement of sutures, and uneventful healing. By sealing the blood vessels and nerve bundles, the laser ensures that there is no bleeding during surgery. This leads to improved visualization of the surgical site, sterile conditions, precise cutting, fewer instruments used, and a suture-free procedure with minimal pain following the procedure. Furthermore, the laser immediately disinfects the surgical site, which reduces the risk of infection after surgery, reduces inflammation, and promotes faster healing of the wound. When compared to surgical excision, the use of a laser lowers intraoperative and postoperative problems in oral cavity lesions. According to White et al., patients tolerate laser excision well and experience no side effects. They added that CO₂ and Nd:YAG laser irradiation work well together to treat surgical patients. Using a mass of granulation tissue and a flash lamp pulsed dye laser, Meffert et al. observed that the previously resolute tissue responded favourably to the pulsed dye laser treatments. When it comes to cutaneous pyogenic granulomas, diode laser treatment has demonstrated remarkable outcomes with very little pigmentary and textural consequences. In 16 out of the 18 patients who received treatment, Gonzales et al. revealed both symptomatic and clinical clearance of the lesions with great cosmetic improvements. Nevertheless, there isn't substantial evidence to support its effectiveness in intraoral pyogenic granulomas.^{8,9,10}

Using a diode laser, we were able to adequately resolve the lesion on the lower gingiva without any complications. Both scarring and

recurrence were absent. For this reason, diode laser therapy for intraoral pyogenic granulomas may be beneficial. In this case study, surgical excision using a 940 nm diode laser was shown to be an easy process with minimal bleeding and excellent precision. The patient received it well and didn't exhibit any signs of fear or discomfort while it was being done. He stated that there was no pain or difficulty following the surgery. In two weeks, there was hardly any scarring or residual ulceration, indicating optimal healing. Furthermore, the removed specimen was sufficient for a histological analysis.

CONCLUSION

In conclusion, the application of lasers provides a novel tool that can alter or enhance the way currently used therapies are carried out. To get the most out of technology, patient acceptability, and post-operative care, modern medicine must investigate and capitalize on emerging trends. Laser therapy has become a part of elite, ethical dentistry practice due to its clinical use and several advantages over traditional surgical methods. Pyogenic granuloma can be successfully removed with a diode laser, reducing patient discomfort both during and after surgery.

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